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**White polymer LED and its integration with polymer transistor**

HSIN-FEI MENG, Institute of Physics, National Chiao Tung University, Hsinchu, Taiwan — Bright white emission with peak luminance near  $10,000 \text{ cd/m}^2$  is achieved in multi-layer homojunction polymer light-emitting diode (PLED) fabricated by multiple spin coating. The homojunction has the advantages of exciton confinement, carrier balance, and reduced cathode quenching. In order to be applied in an all-polymer active matrix display, multi-layer PLED is integrated with polymer transistor to form a polymer active pixel without the patterning of any polymer layer. The key idea is to replace the conventional conductive hole-transport layer (HTL) for the PLED by a semiconductor, which can then be shared with the transistor in the integrated structure. In this integration both the semiconductor layer and the emissive layer can be spin-coated in large area covering the whole active matrix. We use high mobility polymer polythiophene for the HTL and the transistor. Peak luminance of  $3000 \text{ cd/m}^2$  for white emission on P3HT is reached. A  $200 \mu\text{m} \times \mu\text{m}$  polymer active pixel free of patterning of any organic layer is demonstrated.

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